

## CLAIMS

What is claimed is:

1. A system for processing a liquefied natural gas feed comprising:
  - a distillation column configured for multistage separation of said liquefied natural gas feed and configured to produce an overhead vapor stream and an overhead vapor product;
  - a first heat exchanger configured to exchange heat between said overhead vapor stream of said distillation column and said liquefied natural gas feed, said first heat exchanger being configured to produce a first heated liquefied natural gas feed;
  - a second heat exchanger configured to exchange heat between said first heated liquefied natural gas feed and said overhead vapor product.
2. The system of claim 1 wherein said second heat exchanger is configured to condense said overhead vapor product.
3. The system of claim 2 further comprising a compressor configured to compress said overhead vapor product before said overhead vapor product exchanges heat in said second heat exchanger.
4. The system of claim 3 further comprising a pump configured to pressurize said condensed overhead vapor product.
5. The system of claim 1 wherein said second heat exchanger is configured to produce a second heated liquefied natural gas feed, wherein said distillation column is configured to produce an ethane-rich product, and wherein said system further comprises a third heat exchanger, said third heat exchanger being configured to exchange heat between said ethane-rich product and said second heated liquefied natural gas feed.

6. The system of claim 5 wherein said third heat exchanger is configured to produce a third heated liquefied natural gas feed and wherein said system further comprises a fourth heat exchanger configured to heat said third heated liquefied natural gas feed to a desired energy level for feed to said distillation column.

7. The system of claim 6 further comprising a compressor configured to compress said overhead vapor product prior to said overhead vapor product entering said second heat exchanger and wherein said second heat exchanger is configured to condense said overhead vapor product.

8. A system for separating a liquefied natural gas stream into a methane-rich product and an ethane-rich product, said system comprising:

a distillation column configured to fractionate said liquefied natural gas stream into said methane-rich product and said ethane-rich product;

a compressor configured to compress said methane-rich product; and

a condenser configured to substantially condense said methane-rich product against said liquefied natural gas stream.

9. The system of claim 8, further comprising a pump configured to pressurize said methane-rich product to a desired pressure.

10. The system of claim 8 wherein said compressor is configured to compress said methane-rich product before said methane-rich product enters said condenser.

11. The system of claim 8, further comprising a first heat exchanger and wherein said distillation column is configured to produce an overhead vapor; said first heat exchanger being configured to exchange heat from said overhead vapor with said liquefied natural gas stream.

12. The system of claim 11 wherein said first heat exchanger is further configured to exchange heat from said overhead vapor with said liquefied natural gas stream before said liquefied natural gas stream is heated by any other heat exchanger.

13. The system of claim 12, further comprising a second heat exchanger configured to exchange heat from said ethane-rich product with said liquefied natural gas stream.

14. The system of claim 13 wherein said second heat exchanger is configured to exchange heat from said ethane-rich product with said liquefied natural gas stream after said liquefied natural gas stream has been heated in said condenser.

15. A method for recovering ethane and heavier components from liquefied natural gas, the method comprising the steps of:

- (a) preheating said liquefied natural gas;
- (b) fractionating said liquefied natural gas into a methane-rich product and an ethane-rich product;
- (c) compressing said methane-rich product; and
- (d) substantially condensing said methane-rich product.

16. The method of claim 15 wherein step (b) comprises producing an overhead vapor and wherein step (a) comprises exchanging heat from said overhead vapor with said liquefied natural gas.

17. The method of claim 16 wherein step (a) further comprises exchanging heat from said methane-rich product with said liquefied natural gas after compression of said methane-rich product.

18. The method of claim 17 wherein step (a) further comprises exchanging heat from said ethane-rich product with said liquefied natural gas.

19. The method of claim 18 wherein step (a) further comprises exchanging heat from said overhead vapor, said methane-rich product, and said ethane-rich product with said liquefied natural gas sequentially in order as listed.

20. The method of claim 16 further comprising:

(e) pumping said methane-rich product as a liquid.

21. A method for preheating liquefied natural gas for feed to a distillation column, wherein said distillation column produces an overhead vapor, an overhead vapor product, and a bottoms product, the method comprising the steps of:

(a) exchanging heat from said overhead vapor with said liquefied natural gas; and

(b) exchanging heat from said overhead vapor product with said liquefied natural gas.

22. The method of claim 21, further comprising:

(c) exchanging heat from said bottoms product with said liquefied natural gas.

23. The method of claim 21 wherein step (b) comprises condensing substantially all of said overhead vapor product.

24. The method of claim 23 wherein step (a) comprises condensing a portion of said overhead vapor.

25. The method of claim 21 further comprising:

(c) compressing said overhead vapor product before step (b).

26. The method of claim 21 wherein step (a) is performed before step (b).

27. The method of claim 23 further comprising:

(c) pumping said condensed overhead vapor product.